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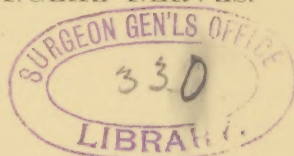
Donaldson

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NOTE ON THE PHYSIOLOGY OF THE RECURRENT LARYNGEAL NERVES.

From the Physiological Institute of the University of Berlin.

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In my original article on the function of the recurrent laryngeal nerve, read before the American Laryngological Association in May, 1886, will be found these two statements, viz.:

"That it is with weak stimuli only (without ether) that abduction of the vocal cords takes place, which movement of abduction gradually passes into one of adduction as the strength of the stimulus is increased," and "*that the rate of stimulation does not affect the general result.*"

After many times contradicting my statement of this perfectly evident physiological fact, Dr. Franklin H. Hooper, of Boston, comes out in the "New York Medical Journal" for November 26, 1887, and says:

"Slow rates of stimulation (eighteen to twenty-eight a second), with *weak currents, produce opening*" [of the glottis.]

"By increasing the rates (thirty to forty a second), the intensity remaining the same, closing is called forth," and

"Rapid rates, with weak or strong currents, produce closing." And so he concludes: "I feel inclined to suspect that the reason other observers have obtained dilatation with feeble currents is to be found in the slow rate of vibration they have used."

This, however, is plainly not the case. In the first place, the various Du Bois-Reymond induction coils which I used in the course of my experiments, extending over eighteen months, did not all beat between eighteen and twenty-eight a second; and, in the second place, as I stated above, I found that the rate of stimulation, with as slow and rapid rates as could be obtained from such a coil, did not affect the *general result*.

I have lately, however, performed some experiments on

this point in the Physiological Institute here, with the kind help of my friend, Professor Sad. We measured the exact rates—slowest and highest—which could be obtained from two Du Bois-Reymond induction coils. We first used a coil of which the slowest rate was twenty a second and the highest forty, and with these rates we *invariably* obtained *abduction* with *weak currents*. The second coil had a slowest rate of forty a second and a highest of eighty,* and with this also we obtained the *same result*, but with this difference: with very rapid rates the abductor fibers are soon exhausted, and abduction quickly gives place to adduction. For, as is well known, the abductor fibers are very prone to exhaustion, and the stimulus from a Du Bois-Reymond coil is the most exhausting we can use.

Finally, there is a slight difference between the effect of the slow and rapid stimuli upon the opening of the larynx, but it is only one of degree, in that, while with very rapid rates perfectly distinct abduction can be obtained, such rates sooner exhaust the abductor fibers, and we have, on stimulation, only adduction. And from these later experiments I can confidently reassert my *original statement*, "that the rate of stimulation does not affect the general result." Under all rates, up to at least one hundred and twenty a second, weak currents produce opening of the larynx.

BERLIN, February, 1888.

* In both these coils the hammer showed double these numbers of *oscillations*, but we could not be certain that the nerve received the same number of stimulations, so we have only reckoned on half the number of stimuli in a second—that is, a stimulus *either* on the make *or* on the break of the contact.

